

# Algebra 2 - Final Exam Review

Cross out problems:

page 5 #1 and 2

page 6 #5 and 6

page 7 #9 and 10

$$5.) \frac{x^2-9}{x^2+2x-8} \cdot \frac{x^2+9x+20}{x^2-3x} =$$

$$\frac{(x+3)\cancel{(x-3)}}{\cancel{(x+4)}(x-2)} \cdot \frac{(x+5)\cancel{(x+4)}}{x\cancel{(x-3)}}$$

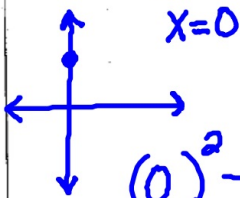
$$\frac{(x+3)(x+5)}{x(x-2)} \text{ or } \frac{x^2+8x+15}{x^2-2x}$$

$$5.) \text{ YOU TRY: } \frac{x^2+6x+9}{x^2+10x+24} \cdot \frac{x^2+3x-18}{x+3} =$$

$$\frac{(x+3)\cancel{(x+3)}}{\cancel{(x+6)}(x+4)} \cdot \frac{\cancel{(x+6)}(x-3)}{\cancel{x+3}}$$

$$\frac{(x+3)(x-3)}{x+4} \text{ or } \frac{x^2-9}{x+4}$$

6.) Find the y-intercept of  $f(x) = \frac{x^2-5x-6}{(x-1)}$ .



$$\frac{(0)^2 - 5(0) - 6}{(0-1)} = \frac{-6}{-1}$$

$$(0, 6)$$

~~NOT~~ (6,0)!!!

6.) YOU TRY: Find the y-intercept of

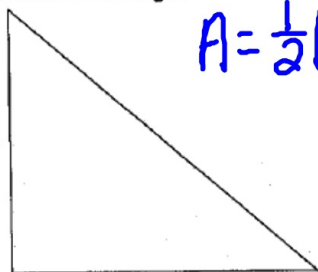
$$f(x) = \frac{x^2+6x+8}{(x-2)}$$

$$X=0$$

$$(0, -4)$$

7.) Find the area of the triangle.

$$h = \frac{20}{10x+20}$$



$$A = \frac{1}{2} b \cdot h$$

$$\frac{x^2+5x+6}{x^2+2x-3} = b$$

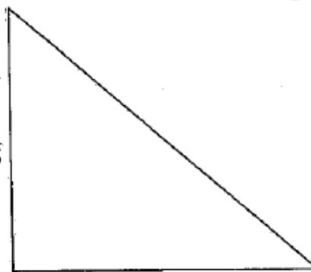
$$\frac{1}{2} \cdot \frac{x^2+5x+6}{x^2+2x-3} \cdot \frac{20}{10x+20}$$

$$\frac{1}{2} \cdot \frac{(x+3)(x+2)}{(x+3)(x-1)} \cdot \frac{20}{10(x+2)}$$

$$\frac{2}{2(x-1)} = \frac{1}{x-1}$$

7.) YOU TRY: Find the area of the triangle.

$$\frac{6x^2+30x}{x^2+6x+5}$$



$$\frac{x^2-x-6}{x^2+4x+4}$$

$$\frac{1}{2} \cdot \frac{(x-3)(x+2)}{(x+2)(x+2)} \cdot \frac{3x(x+5)}{(x+1)(x+5)}$$

$$\frac{3x(x-3)}{(x+2)(x+1)} \text{ or } \frac{3x^2-9x}{x^2+3x+2}$$

3.) Solve  $9^{3x} = 81^{x-4}$

$$9^{3x} = 9^{2(x-4)}$$

$$\begin{array}{r} 3x = 2x - 8 \\ -2x \quad -2x \\ \hline x = -8 \end{array}$$

- A) 8
- B) -2
- C) -8
- D) -4

3.) YOU TRY: Solve  $64^{2x-3} = 256^{4-x}$

$$2^{6(2x-3)} = 2^{8(4-x)}$$

$$4^{3(2x-3)} = 4^{4(4-x)}$$

$$\begin{array}{r} 6x - 9 = 16 - 4x \\ +4x \quad +4x \\ \hline 10x - 9 = 16 - 4x \end{array}$$

$$10x = 25$$

$$x = \frac{25}{10} = \frac{5}{2}$$

4.) Joshua sets up a savings plan to transfer money from his checking account to his savings account. The first week \$5 is transferred, the second week \$10 is transferred, and the third week \$20 is transferred. If this pattern continues and he starts with \$150 in his checking account, how many weeks will pass before his balance is at/below zero?

$$\begin{array}{r} 150 \quad 145 \quad 135 \quad 115 \quad 75 \\ -5 \quad -10 \quad -20 \quad -40 \quad -80 \quad 160 \\ \hline 145 \quad 135 \quad 115 \quad 75 \quad -5 \end{array}$$

5 weeks

4.) YOU TRY: Brad sets up a savings plan to transfer money from his checking account to his savings account. The first week \$20 is transferred, the second week \$24 is transferred, the third week \$32 is transferred, and the fourth week \$48 is transferred. If this pattern continues and he starts with \$200 in his checking account, how many weeks will pass before his balance is at/below zero?

$$\begin{array}{r} 200 \quad 180 \quad 156 \quad 124 \quad 76 \\ -20 \quad -24 \quad -32 \quad -48 \quad -80 \quad 144 \\ \hline 180 \quad 156 \quad 124 \quad 76 \quad -4 \end{array}$$

5 weeks

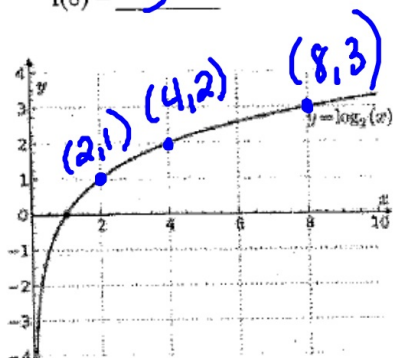
7.) A logarithmic function is graphed below, find the value of the following:

$x$  looking for  $y$ .

$$f(2) = \underline{1}$$

$$f(4) = \underline{2}$$

$$f(8) = \underline{3}$$

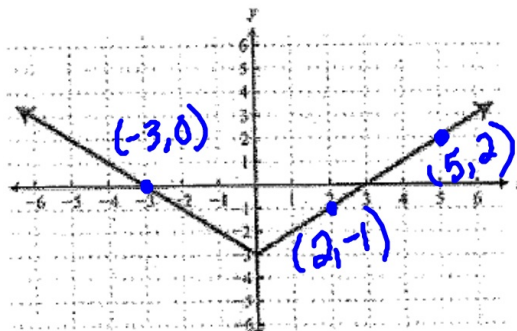


7.) An absolute value function is graphed below, find the value of the following:

$$f(-3) = \underline{0}$$

$$f(2) = \underline{-1}$$

$$f(5) = \underline{2}$$



8.) If  $7^x = 35$ , find the value of  $7^{-x}$ .

$$7^{-x} = \frac{1}{7^x} = \frac{1}{35}$$

8.) YOU TRY: If  $25^{2x} = 125^{x-3}$ , find the value of  $5^{-x}$ .

$5^x = 20$  what's  $5^{-x}$ ?

$$5^{-x} = \frac{1}{5^x} = \frac{1}{20}$$

$3^x = 17$  what's  $3^{-x}$ ?

$$\boxed{\frac{1}{17}}$$

1.) What is the slope of the line  $4x - 3y = 9$ ? ~~-4x~~  $-4x$

$$\frac{-3y}{-3} = \frac{-4x+9}{-3}$$

$$y = \frac{4}{3}x - 3$$

$$m = \frac{4}{3}$$

$$y = mx + b$$

↓  
slope

1.) YOU TRY: What is the slope of the line  $3x + 2y = 6$ ?

$$\frac{2y}{2} = \frac{-3x+6}{2}$$

$$y = -\frac{3}{2}x + 3$$

$$m = -\frac{3}{2}$$

2.) Given that one zero of  $f(x) = x^3 + 9x^2 + 23x + 15$  is  $-5$ , what are the other two zeros? plug answers in to get zero

$$\begin{array}{r|rrrr} -5 & 1 & 9 & 23 & 15 \\ & + & -5 & -20 & -15 \\ \hline & 1 & 4 & 3 & 0 \end{array}$$

$$x^2 + 4x + 3 = 0$$

$$(x+3)(x+1) = 0$$

(A) 3, 1

(B) 4, 1

(C) -3, -1

(D) -4, 1

$$x = -3, -1$$

2.) YOU TRY: Given that one zero of  $f(x) = x^3 - x^2 - 14x + 24$  is 3, what are the other two zeros?

(A) 4, -2

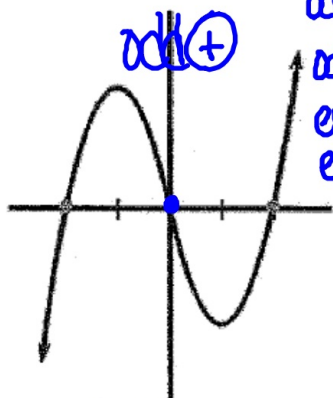
(B) -4, 2

(C) -4, -2

(D) 4, 2



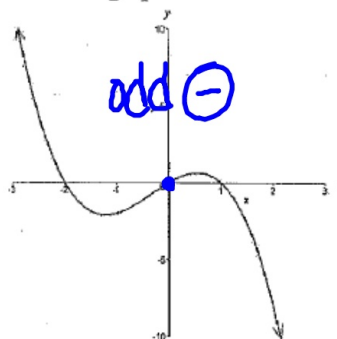
3.) Which of the following equations could represent the graph below:



odd  $\oplus = \downarrow \uparrow$   
 odd  $\ominus = \uparrow \downarrow$   
 even  $\oplus = \uparrow \uparrow$   
 even  $\ominus = \downarrow \downarrow$

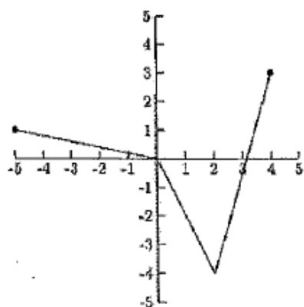
- a.)  $x^3 + 4x$  odd  $\oplus$   
 b.)  $x^3 - 4x$  odd  $\ominus$   $(0)^3 - 4(0) = 0$   
 c.)  $x^3 - 2x + 2$  odd  $\oplus$   $(0)^3 - 2(0) + 2 = 2$   
 d.)  $x^3 + 2x - 2$  odd  $\ominus$

3.) YOU TRY: Which of the following equations could represent the graph below:



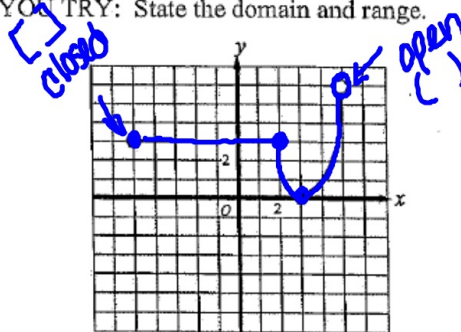
- a.)  $x^3 - 2x^2 - 1$   
 b.)  $-x^3 + 2x^2 - 1$   $(0, -1)$   
 c.)  $x^3 - x^2 - x$   
 d.)  $-x^3 + x^2 + 2x$   $(0, 0)$

4.) State the domain and range.



$x \in \mathbb{R}$   
 Domain:  $[-5, 4]$   
 $y \in \mathbb{R}$   
 Range:  $[-4, 3]$

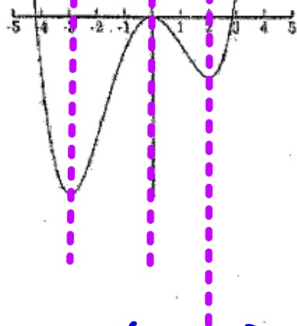
4.) YOU TRY: State the domain and range.



Domain:  $[-5, 5)$   
 Range:  $[0, 6)$

5.) Identify the intervals of increase and decrease.

-5 Dec -3 Inc 0 Dec 3

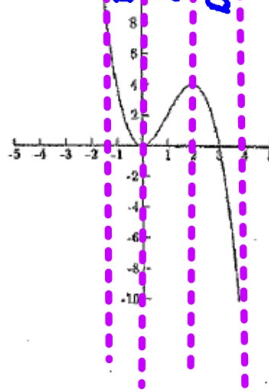


Increase:  $(-3, 0)$   $(2, 3)$

Decrease:  $(-5, -3)$   $(0, 2)$

5.) YOU TRY: Identify the intervals of increase and decrease.

-1 Dec 0 Inc 2 Dec 4

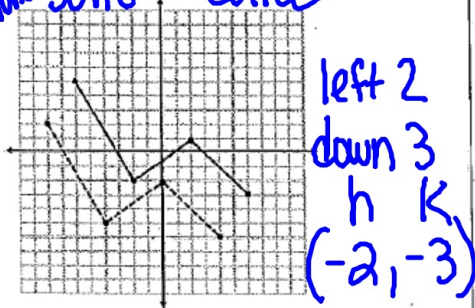


Increase:  $(0, 2)$

Decrease:  $(-1, 0)$   $(2, 4)$

6.) The solid graph represents the graph of  $f(x)$ . The dotted graph represents which transformation of the solid graph?

from solid to dotted



left 2  
down 3  
h k  
 $(-2, -3)$

a.)  $f(x - 2) + 3$

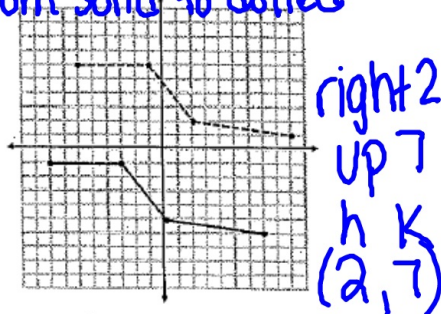
b.)  $f(x + 2) - 3$

c.)  $f(x + 3) - 2$

d.)  $f(x - 3) + 2$

6.) YOU TRY: The solid graph represents the graph of  $f(x)$ . The dotted graph represents which transformation of the solid graph?

from solid to dotted



right 2  
up 7  
h k  
 $(2, 7)$

a.)  $f(x + 2) - 7$

b.)  $f(x - 2) + 7$

c.)  $f(x + 7) - 2$

d.)  $f(x - 7) + 2$

$$\log_3 27 = x \quad 3^x = 27$$

$$x = 3$$

$$\log_5 \frac{1}{25} = x \quad 5^x = \frac{1}{25}$$

$$x = -2$$

$$\log_2 16 = x \quad 2^x = 16$$

$$x = 4$$

$$6,500,000 (1.04)^{10}$$

9,621,588 people



$$3\sqrt{75} - 2\sqrt{48} + \sqrt{300}$$

$$\begin{array}{c} \wedge \\ 5 \quad 5 \\ \wedge \\ 5 \quad 3 \end{array}$$

$$\begin{array}{c} \wedge \\ 16 \quad 3 \\ \wedge \\ 4 \quad 4 \end{array}$$

$$\begin{array}{c} \wedge \\ 100 \quad 3 \\ \wedge \\ 10 \quad 10 \end{array}$$

$$15\sqrt{3} - 8\sqrt{3} + 10\sqrt{3}$$

$$17\sqrt{3}$$

$$4^{4x-1} = 64^{2x-11}$$

$$\cancel{4}^{4x-1} = \cancel{4}^{3(2x-11)}$$

$$4x-1 = 6x-33$$

$$32 = 2x$$

$$x = 16$$

$$500 (0.82)^5$$

$$\sqrt[3]{54x^7y^9z^2}$$

$$\begin{array}{c} 54 \\ \swarrow \searrow \\ 9 \quad 6 \\ \swarrow \searrow \swarrow \searrow \\ 3 \quad 3 \quad 3 \quad 2 \end{array}$$

$$3x^2y^3 \sqrt[3]{2xz^2}$$

